

assembling means such as screws may be employed instead of the assembling holes 175b and the assembling protuberances 202.

[0075] FIG. 9 is an exploded perspective view of a rotary-type hinge module 700 of a portable wireless terminal according to a third preferred embodiment of the present invention, and FIG. 10 is a perspective view of the rotary-type hinge module 700 shown in FIG. 9. The rotary-type hinge module 700 according to the third preferred embodiment of the present invention includes the same elements as those in the first embodiment, except for a hinge housing 710 and a rotary shaft 770. Therefore, the description about the third embodiment of the present invention will be given in relation to only the hinge housing 710 and the rotary shaft 770.

[0076] FIG. 11 is a perspective view of the hinge housing 710 employed in the rotary-type hinge module 700 shown in FIG. 9. As apparent from in FIGS. 9 and 11, the hinge housing 710 is different from the hinge housing 110 according to the first embodiment, in that a receiving hole 719b for receiving the folder-opening hinge module 300 shown in FIG. 7 is formed at one end of the hinge housing 710. That is to say, while the folder-opening hinge module 300 is received in the terminal body 210 of wireless terminal in the first embodiment of the present invention, the rotary-type hinge module 700 according to the third embodiment of the present invention has a construction capable of receiving the folder-opening hinge module 300.

[0077] When the hinge module 300 is received in the receiving hole 719b of the hinge housing 710 of the rotary-type hinge module 700, the shaft portion 333 of the folder-opening hinge module 300 protrudes out of the hinge housing 710. A hinge shaft hole (not shown) corresponding to the shaft portion 333 is formed at the terminal body 210.

[0078] FIG. 12 is a perspective view of the rotary shaft 770 of the rotary-type hinge module 700 shown in FIG. 9. As shown in FIGS. 9 and 12, the rotary shaft 770 according to the third embodiment of the present invention is different from the rotary shaft 170 according to the first embodiment of the present invention, in that assembling wings 775a which form a means for assembling the rotary shaft 770 with the folder are formed at opposite sides of a closed end 771b of the rotary shaft 770, and a predetermined flat surface 779 is formed at one side of the closed end 771b of the rotary shaft 770.

[0079] The assembling wings 775a and the flat surface 779 prevent load by the rotational force of the folder from being concentrated to a specific portion of the folder housing or the rotary shaft 770 when the folder of the wireless terminal is rotated about axis A2, thereby preventing the rotary-type hinge module 700 or the folder housing from being broken.

[0080] The assembling wings 775a extend laterally outward from opposite sides of the closed end 771b of the rotary shaft 770. Both surfaces of each of the assembling wings 775a are oriented in the longitudinal direction of the rotary shaft 770, so that they can endure better the load due to the rotational force. The assembling wings 775a extend longer than the hinge housing 710, and preferably extend as long as possible to be similar to the width of the folder of the portable wireless terminal. This is because, the longer the

assembling wings 775a are, the better the load from rotation is distributed. The ribs 775b extend in the longitudinal direction of the rotary shaft 770 from end portions of the assembling wings 775a. Assembling holes 775c assembled with the folder of the wireless terminal are formed each through each of the ribs 775b. The ribs 775b are disposed inside of the folder and assembled with the folder by means of screws, and so on.

[0081] Also, a stopper 775d is formed on a surface of the assembling wings 775a, which is opposed to the hinge housing 710, and a sliding groove 717 corresponding to a rotation trace of the stopper 775d is formed on the hinge housing 710. The sliding groove 717 causes the range within which the stopper 775d can be rotated to be limited to 180°.

[0082] FIG. 13 is an exploded perspective view of a folder housing 290 with which the rotary-type hinge module 700 shown in FIG. 9 is assembled. It is preferred to utilize a predetermined frame 270 in order to assemble the rotary-type hinge module 700 with the folder housing 290. The frame 270 may be manufactured integrally with the rotary shaft 770 of the rotary-type hinge module 700.

[0083] While the folder 250 is being opened or closed with respect to the terminal body, the frame 270 prevents the moment of rotational force of the folder from being concentrated on the ribs 775b and assembling holes 291 of the folder housing 290, thereby preventing the ribs 775b or the folder housing 290 from being damaged. With the frame 270 in place, the frame 270 directly transmits the rotational force of the folder 250 generated by a user to the axis of the folder-opening hinge module 300, that is, to axis A1. Further, a circuit section 280 received in the folder housing 290 can be received in the frame 270, so that a separate means for fixing the circuit section 280 to the folder housing 290 is unnecessary. The circuit section 280 includes a display 281, which is usually a liquid crystal display (LCD), a flexible printed circuit board 283, and so on.

[0084] Meanwhile, assembling holes 291 corresponding to the assembling holes 775c of the rib 775b are formed at side portions of the lower end of the inner surface of the folder housing 290, so that the rotary-type hinge module 700 can be assembled with the folder housing 290 by means of screws 299 screwed through the assembling holes 775c into the assembling holes 291. Also, the folder housing 290 may further have a recess 295 in which the rotary shaft 770 and the assembling wings 775a of the rotary-type hinge module 700 are received by means of a rib 293.

[0085] The screws 299 may be screwed not only through the ribs 775b of the rotary-type hinge module 700 but also through assembling holes 271 formed at the frame 270 into the assembling holes 291 of the folder housing 290.

[0086] FIG. 14 is a partial sectional view of a portable wireless terminal with which the rotary-type hinge module 700 shown in FIG. 9 is assembled. As shown in FIG. 14, the folder-opening hinge module 300 is received in the hinge housing 710 of the rotary-type hinge module 700 according to the third embodiment of the present invention, and the shaft portion 333 of the folder-opening hinge module 300 is assembled with the terminal body 210 of the portable wireless terminal.

[0087] FIG. 15 is an exploded perspective view of a rotary-type hinge module 800 of a portable wireless terminal